McBee cards for Baker Island, U. of Hawaii (August 1969)

Cenchus echinatus L., Long 2173
Digitaria pacifica Stapf., Christophersen 38, Bryan 1321, Long 2172
Eragrostis (amabilis(L.) Wight), Comon Expedition n.d.,
E. falcata (Gaud.) Gaud. = E. whitneyi ? Fosberg, Christophersen 30,
Lepturus repens (Forst.) R. Br., Christophersen 31, ~~xxxxx~~ Comon Exp.,s.d., Bryan ~~xxxx~~1323,
Long 2151, 2153, 2162, 2372, 2387,
Setana verticellata (L.) Beauv., Long 2150
Fimbristilis pycnocephala Christophersen 32, ~~xxxxxxxxxxxxxxxxxxxx~~
F. cymosa R. Br. var. microcephala F. Br., Bryan s.d., Long 2399
Boerhaavia tetrondra Forst. diffusa var., Christophersen 37m Bryan 1324
Boerhavia, Long 2152, 2159, 2161, 2163, 2366,2373, 2377, 2401
Portulaca oleracea L, Christophersen 25, Bryan 1313, Long 2154, 2375
P. lutea Sol, Christophersen 34, Bryan 1318, 2388, 2389, 2396, 2402
Tribulus cistoides L., Christophersen 26, Bryan s.d., Long 2156, 2393,
Euphorbia hirta L., Christophersen 35, Bryan 1310, Long 2164, 2170, 2365,
Phyllanthus niruri L., Christophersen 28
P. amarus Schum. & Thom., Long 2049, 2374
Triumfetta procumbens Forst., Christophersen 29, Bryan 1320, Long 2160, 2364
Abutilon indicium G. Don, Christophersen 23
A. i. Sw., Long 2371x (sic)
Sida fallax Walp., Long 2157, 2371, 2400
Thespesia populnea (L.) Soland., Bryan, 1314
Terminalia catappa L., Bryan, 1311
Ipomoea companulata L., Christophersen 27
I. grandiflora (Choisy) Hallier, Bryan 1319
I. pes-caprae (L.) Sw., ~~xxx~~ Long 2169, 2363
Cordia subcordata Lon. Long 2171
Vitex negundo var. bicolor (W'uld). H. Lan, Bryan 1315

Baker Island - Summary

(taken from notes by Peter Marshall)

Plant No. 1 - Wide blade grass. Seeds on long stalk, common over all of the island. Digitaria

Plant. No. 2 - Small leaf succulent, compared in photo with larger leaved variety. Found only in vicinity of lighthouse. P. lanceus

Plant. No. 3 - and 4 - There seemed to be two varieties of the type of succulent with the leaves all pointing the same way. One with large leaves, one with small. This was quite confusing. They were different also in the type of stems. The large one having a light stem, the small leaf one having black stems. P. fuscus

Plant No. 5 - Sensitive mimosa plant. Only in camp area, leaves close when touched. Phyllanthus amarus

Plant No. 6 - Dark leafed plant. All specimens seen were under six inches high, very few plants (6). In camp area only. E. hirta

Plant No. 7 - The only plant with any semblance of being a tree. This plant had hard woody branches that made good burning wood. All over the island not all were blooming. Sida fallax

Plant No. 8 - Morning glory. Along all the shore of the island. I. pes-caprae

Plant No. 9 - Succulent with circular leaf pattern. Flower 5 petals, each notched. Wide spread. Portulaca oleracea

Plant No. 10 - Beach grass. A bunch grass with red roots that grows only along the beach. Leaves very fine. L. repens.

Plant No. 11 - Inland buch grass. Wider leaves than No. 10. Covering the inner island.

Plant No. 12 - Crawling plant. Covers island. Most in bloom and very lush.

Plant No. 13 - Bermuda grass. One area of growth near lighthouse. Not collected.

Plant No. 14 - Sticker Plant (Tribulus ?). Covers center of island. Very lush, and flowering. Not collected. No photo.

Howland Island - Summary

(taken from notes by Peter Marshall)

Plant No. 1 - Succulent type plant. Note leaves are orientated circularly about stem. Upper branches re-brown. Pepper-fine black seeds. Wide spread over island.

Plant No. 2 - Crawling plant (Boerhavia ?) - small white flowers, all over island.

Plant No. 3 - Different succulent plant. Differs from No. 1 by leaves which all point the same direction, and the upper stem which is white. Grows in bunches. Lower stem black. Not as common as No. 1.

Plant No. 4. - Hibiscus type tree. 10 feet high, 2 left in depression on middle of Island. Evidence of many more at one time.

Plant No. 5 - Sticker weed (Tribulus ?). Wide spread on island. Crawling plant.

Plant No. 6 - Tree - one tree at corner of Itascatown.

Plant No. 7 - Wide blade grass. Two feet high not common.

Plant No. 8 - narrow - blade grass. Very common.

Baker Island - Summary

(taken from notes by Peter Marshall)

Plant No. 1 - Wide blade grass. Seeds on long stalk, common over all of the island. Digitaria

Plant. No. 2 - Small leaf succulent, compared in photo with larger leaved variety. Found only in vicinity of lighthouse. I. Lewisii

Plant. No. 3 - and 4 - There seemed to be two varieties of the type of succulent with the leaves all pointing the same way. One with large leaves, one with small. This was quite confusing. They were different also in the type of stems. The large one having a light stem, the small leaf one having black stems. I. Watsonii

Plant No. 5 - Sensitive mimosa plant. Only in camp area, leaves close when touched. Phyllanthus amarus

Plant No. 6 - Dark leafed plant. All specimens seen were under six inches high, very few plants (6). In camp area only. E. humistratum

Plant No. 7 - The only plant with any semblance of being a tree. This plant had hard woody branches that made good burning wood. All over the island not all were blooming. Sida fallax

Plant No. 8 - Morning glory. Along all the shore of the island. I. pes-caprae

Plant No. 9 - Succulent with circular leaf pattern. Flower 5 petals, each notched. Wide spread. Portulaca oleracea

Plant No. 10 - Beach grass. A bunch grass with red roots that grows only along the beach. Leaves very fine. L. mollis.

Plant No. 11 - Inland buch grass. Wider leaves than No. 10. Covering the inner island.

L. repens

Plant No. 12 - Crawling plant. Covers island. Most in bloom and very lush.

Boulevardia

Plant No. 13 - Bermuda grass. One area of growth near lighthouse. Not collected.

cynodon dactylon (L.) Pers.

Plant No. 14 - Sticker Plant (Tribulus ?). Covers center of island. Very lush, and flowering. Not collected. No photo.

Tribulus cistoides

Howland Island - Summary

(taken from notes by Peter Marshall)

Plant No. 1 - Succulent type plant. Note leaves are orientated circularly about stem. Upper branches re-brown. Pepper-fine black seeds. Wide spread over island.

Plant No. 2 - Crawling plant (Boerhavia ?) - small white flowers, all over island.

Plant No. 3 - Different succulent plant. Differs from No. 1 by leaves which all point the same direction, and the upper stem which is white. Grows in bunches. Lower stem black. Not as common as No. 1.

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Plant No. 6 - Tree - one tree at corner of Itascatown.

Plant No. 7 - Wide blade grass. Two feet high not common.

Plant No. 8 - narrow - blade grass. Very common.

Vascular plants recorded from Baker Island

by C. R. Long

Palmae)

Cocos nucifera L.

Gramineae

Conchrus echinatus L.
C. R. Long 2173 (UH).

Cynodon dactylon (L.) Pers.
C. R. Long s.n. (UH).

Digitaria pacifica Stapf.
E. Christophersen 38 (BISH), E. H. Bryan, Jr. 1321 (BISH), P. Marshall 1 (USNM), C. R. Long 2172 (UH).

Panicum atenatophroides
as Panicum stenotaphroides

Eragrostis amabilis (L.) W. & A. = E. tenella (Link) Beauv.
D. Coman (BISH).

Eragrostis whitneyi Fosberg
E. Christophersen 30 (BISH).

Lepturus repens (Forst.) R. Br.
E. Christophersen 31 (BISH), D. Coman (BISH), E. H. Bryan, Jr. 1323 (BISH), P. Marshall 10, 11 (USNM), C. R. Long 2151, 2153, 2162, 2372, 2387 (UH).

Setaria verticellata (L.) Beauv.
C. R. Long 2150 (UH).

Cyperaceae

Fimbristylis cymosa R. Br.
as F. pycnocephala Hbd. and F. cymosa var. microcephala F. Brown
E. Christophersen 32 (BISH), E. H. Bryan, Jr. (BISH), C. R. Long 2399 (UH).
as F. cymosa var. microcephala F. Br.

Nyctaginaceae

Boerhavia sp.
as B. tetrandra Forst.
E. Christophersen 37 (BISH), E. H. Bryan, Jr. 1324 (BISH), P. Marshall 12 (USNM), C. R. Long 2152, 2159, 2161, 2163, 2366, 2373, 2377, 2401 (UH).
as B. tetrandra Forst.

Portulacaceae

Portulaca lutea Sol.
E. Christophersen 34 (BISH), E. H. Bryan, Jr. ~~1313~~, 1318 (BISH), P. Marshall 3, 4 (USNM), C. R. Long ~~2154~~, ~~2375~~, 2388, 2389, 2396, 2402 (UH).

Portulaca oleracea L.
E. H. Bryan, Jr. 1313 (BISH)
P. Marshall 2 (USNM), C. R. Long 2154, 2375 (UH).

Zygophylaceae

Tribulus cistoides L.
E. Christophersen 26 (BISH), E. H. Bryan, Jr. (BISH), P. Marshall 14 (USNM), C. R. Long 2156, 2393 (UH).

Euphorbiaceae

Euphorbia hirta L.
E. Christophersen 35 (BISH), E. H. Bryan, Jr. 1310 (BISH), P. Marshall 6 (USNM), C. R. Long 2164, 2170, 2365 (UH).

Phyllanthus amarus Sch. and Thonn.
E. Christophersen 28 (BISH), P. Marshall 5 (USNM), C. R. Long 2049, 2374 (UH).

Tiliaceae

Triumfetta procumbens Forst. f.
E. Christophersen 29 (BISH), E. H. Bryan, Jr. 1320 (BISH), C. R. Long 2160, 2364 (UH).

Combretaceae

Terminalia catappa L.
E. H. Bryan, Jr. 1311 (BISH).

Malvaceae

Abutilon indicum Sw.
E. Christophersen 23 (BISH), C. R. Long 2371 (USNM).

Sida fallax Walp. Christophersen 36 (Bish) or Scoparia L.? Bryan s.n. (Bish),
P. Marshall 7 (USNM), C. R. Long 2157, 2371, 2400 (UH).

Thespesia populnea (L.) Sol.
E. H. Bryan, Jr. 1314 (BISH).

Convolvulaceae

Ipomoea tuba (Schlecht.) Don. or I. campanulata L.
E. Christophersen 27 (BISH), E. H. Bryan, Jr. 1319 (BISH). or I. grandiflora (Lodd.) Hallier

Ipomoea pes-caprae ssp. brasiliensis (L.) Van Ooststr.
P. Marshall 8 (USNM), C. R. Long 2169, 2363 (UH).

Boraginaceae

Cordia subcordata Lam.
C. R. Long 2171 (UH).

Verbenaceae

Vitex negundo var. bicolor (Willd.) Lam.
E. H. Bryan, Jr. 1315 (BISH).

Notes on the Vegetation of Baker Island

by C. R. Long

Vascular Plants Recorded from Baker Island

Twenty-four species of vascular plants have been recorded and/or collected from Baker Island. Of these, eight species are considered native. The remaining sixteen species are accidental or deliberate introductions. Of the sixteen introduced species only three (i.e., Digitaria, Portulaca oleracea and Euphorbia hirta) appear to have naturalized to any extent. Digitaria is the only species which appears likely to compete with the native vegetation over large areas of the island.

Collections of vascular plants from Baker Island have been made by the following: E. Christophersen, September 1924; D. Coman, November 1935; E. H. Bryan, Jr., July 1938; P. Marshall, July 1963; C. R. Long, July and October 1964.

Gramineae

Cenchrus echinatus L.

Long 2173 (UH). Three clumps of this burrgrass were confined to the sandy ridge of the southwest end of the island. Introduced and apparently not spreading. First collected in July 1964 probably of World War II introduction.

Cynodon dactylon (L.) Pers.

Long s. n. (UH). One large clump in sand on the southwest end. Probably of World War II introduction.

Digitaria pacifica Stapf.

Christophersen 38 (BISH) as Panicum stenotaphroides, Bryan 1321 (BISH), Marshall 1 (USNM), Long 2172 (UH). Common in disturbed sites of the central area, on the runway and in sand on the west ridge forming pure stands. From a comparison of Bryan's photographs with those taken by BOBSP in 1964-65 it is apparent that this species forms a greater portion of the vegetation cover. A ready colonizer of disturbed sites first collected on Baker Island in 1924 and probably introduced during the era of guano mining.

Eragrostis tenella (Link) Beauv. = E. amabilis (L.) W. and A.

D. Coman s. n. (BISH). Probably introduced by a landing party in this century after Christophersen's visit.

Eragrostis whitneyi Fosberg

E. Christophersen 30 (BISH) as E. falcata (Gaud.) Gaud. If Fosberg's

E. whitneyi var. caumii (from the Hawaiian Leewards) is recognized as distinct the taxon formerly found on Baker Island would be var. whitneyi. This species has not been collected since 1924. Christophersen found this native grass "on the beach" which suggests that this species is a wave carried adventive.

Lepturus repens (Forst.) R. Br.

Christophersen 31 (BISH), Coman s. n. (BISH), Bryan 1323 (BISH)? Marshall 10, 11 (USNM), Long 2151, 2153, 2162, 2372, 2387 (UH). The Pacific bunchgrass is found inside the beach ridge and most commonly on the flat interior area. Thick clumps found along the west beach ridge form pure stands. First collected in 1924 from "beach sand" by Christophersen and later by Bryan from the central basin forming an association with Boerhavia and Portulaca.

Setaria verticellata (L.) Beauv.

Long 2150 (UH). Four clumps were found on the southwest side in sand. Probably introduced during the Second World War and not spreading.

Cyperaceae

Fimbristylis cymosa R. Br.

Christophersen 32 (BISH) as F. pycnocephala Hbd. and F. cymosa var. microcephala F. Brown, Bryan s. n. (BISH) as F. cymosa var. microcephala F. Brown, Long 2399 (UH). Reported from "pockets in conglomerate bedrock" (Christophersen) and from "moist spot amid dunes" (Bryan). Found in 1964 in soil pockets of steel matting of runway built during the Second World War. Long's specimen is not identical with the earlier collections and may represent a later introduction.

Palmae

Cocos nucifera L.

An attempt was made to introduce this species during the 1930's. While the trees seemed to thrive under cultivation they eventually succumbed to the ravages of rats and crabs (Rodman, 1935; Piianaia, 1936).

Nyctaginaceae

Boerhavia sp.

Christophersen 37 (BISH) as B. tetrandra Forst., Bryan 1324 (BISH) as B. tetrandra Forst., Marshall 12 (USNM), Long 2152, 2159, 2161, 2163, 2366, 2373, 2377, 2401 (UH). This native herb is common over the island especially in sandy soils. The taxonomy of this genus in the central Pacific is confused and until studies now underway are completed it seems best not to designate a specific epithet. This white flowered species may be identical to the probable new taxon referred to by Fosberg and as yet unnamed (Fosberg, 1959).

Portulacaceae

Portulaca lutea Sol.

Christophersen 34 (BISH), Bryan 1318 (BISH), Marshall 3, 4 (USNM), Long 2388, 2389, 2396, 2402 (UH). Native herb common in flat areas on the north and south side and formerly more abundant on guano soils of the central portion of the island.

Portulaca oleracea L.

Bryan 1313 (BISH), Marshall 2 (USNM), Long 2154, 2375 (UH). Introduced after Christophersen's 1924 visit. Found on the southwest and northeast sides in 1964.

Zygophyllaceae

Tribulus cistoides L.

Christophersen 26 (BISH), Bryan s. n. (BISH), Marshall 14 (USNM), Long 2156, 2393 (UH). A native herb mentioned by Emerson (1869). Found in 1964 as scattered masses on the interior flat portion of the island, very often in disturbed sites.

Euphorbiaceae

Euphorbia hirta L.

Christophersen 35 (BISH), Bryan 1310 (BISH), Marshall 6 (USNM), Long 2164, 2170, 2365 (UH). Common locally in sand on the southwest end of the island probably introduced during the guano mining operations.

Phyllanthus amarus Sch. and Thonn.

Christophersen 28 (BISH), Marshall 5 (USNM), Long 2049, 2374 (UH). Probably introduced by guano mining activities and later collected from sand on the west beach crest by Christophersen. Found on the interior of the island in 1964.

Tiliaceae

Triumfetta procumbens Forst. f.

Christophersen 29 (BISH), Bryan 1320 (BISH), Long 2160, 2364 (UH). Prostrate native vine confined to the northwest and north sand beaches, common locally.

Combretaceae

Terminalia catappa L.

Bryan 1311 (BISH). Planted by colonists in 1930's. An unsuccessful introduction.

Malvaceae

Abutilon indicum SW.

Christophersen 23 (BISH), Long 2371 (UH). Rare. Probably introduced during guano mining operation. Occurs also on Jarvis Island.

Sida fallax Walp.

Christophersen 36 (BISH), as S. cordifolia L., Bryan s. n. (BISH), Marshall 7 (USNM), Long 2157, 2371, 2400 (UH). Common on the interior of the island especially on the rubble strewn north side and south of the runway.

Thespesia populnea (L.) Sol.

Bryan 1314 (BISH). Planted by colonists in the 1930's but unsuccessful.

Convolvulaceae

Ipomoea tuba (Schlecht.) Don.

Christophersen 27 (BISH) as I. campanulata L., Bryan 1319 (BISH) as I. grandiflora (Choisy) Hallier. Reportedly found on the west sand beach, possibly a wave carried adventive or introduced at an earlier date.

Ipomoea pes-caprae ssp. brasiliensis (L.) Van Ooststr.

Marshall 8 (USNM), Long 2169, 2363 (UH). Found in sand at the west end of the runway. Introduced after 1938 possibly a wave carried adventive.

Boraginaceae

Cordia subcordata Lam.

Long 2171 (UH) Three short impoverished trees planted on the northwest side during World War II. In a very dry state in 1964; to 1.8 m. high.

Verbenaceae

Vitex negundo var. bicolor (Willd.) Lam.

Planted by colonists in the 1930's but unsuccessful.

A number of unsuccessful introductions were attempted by the colonists during the 1930's (Rodman, 1935; Colonists' Daily Log, 1936). These are listed as follows: Calocasia esculenta, Brassica oleracea, Brassica rapa, Beta vulgaris, Solanum tuberosum, Ipomoea batatas, Daucus carota, Allium sp., Citrus sp., and Sida sp. (probably cordifolia).

Vegetation History

Early accounts give meager information concerning the natural vegetation of Baker Island prior to the guano mining activities which according to Hutchinson (1950) removed between 250,000 and 300,000 tons of surface materials. The earliest account (Hague, 1862) describes the marginal sandy ridge as "partially covered with a rank growth of long, coarse grass (Lepturus), portulaca (Portulaca lutea), mesembryanthemum (Sesuvium) and a few other species of plants." The same author noted that "none of the grass that grows abundantly on the margin is found on the guano, but there are one or two species of portulaca occurring in certain parts, (particularly where the guano is shallowest and driest)..." This account clearly designates two plant associations. The first refers to a Lepturus association confined to the sandy margins of the island, and the second to a Portulaca association found on guano soils in the interior. Sesuvium is recorded from the marginal sand ridge. Although this species appears more common and vigorous on the lagoon margins over hardpans this author has found it in sand on both Enderbury and Birnie Islands. The plants observed by Hague may represent remnant populations of a former lagoon mat. Another early history (Emerson, 1869) offers a record of other native species. Emerson states that the island "...has enough soil to support a stunted vegetation. This consists of a coarse grass, used for thatching huts (Lepturus or possibly the introduced Digitaria); a hardy species of parsley (Apium petroselinum); a woody bush with pretty yellow flowers called by the Hawaiian's I-li-ma (Sida fallax); a plant which has a tuberous root, resembling a four o'clock (possibly Boerhavia)...and a vine bearing fragrant yellow flowers and troublesome thorns that are shaped like caltrops (Tribulus)." Surveys of Baker Island were reported on by Christophersen (1927) and Bryan (1942). The latter author mentions sixteen species of plants observing that Lepturus is found in approximately the same area as that mentioned by Hague. Bryan also observed that Digitaria was found on the inner flat from which the guano had been removed. This is approximately equivalent to the distribution of the heaviest stands of these two grass species in 1964. During the 1930's a number of species were cultivated by the colonists but most were lost to rats and crabs (Rodman, 1935; Colonists' Daily Log, 1936). This account points up the possibly important role of hermit crabs as regards the success of seedling plants which germinate after the infrequent rains. During World War II Baker Island was used as a staging point for the invasion of the Gilbert Islands (Anon., 1943). Grading and laying of an airstrip was completed in September 1943. The displacement of the surface soil layers of Baker Island has taken place from the nineteenth century guano mining operations through the Second World War runway and building construction (in excess of 2000 men were housed on the island).

The Vegetation

The removal of guano and the subsequent leveling of the sandy marginal areas have resulted in the production of a sandy soil over most of the surface of the island. This disruption of the soil layers has resulted in a mixture of the pre-European plant associations. In 1964 Lepturus was observed as common on the interior of the island especially in those areas along the runway where the sand from the margin of the island had been distributed. Portulaca lutea, Boerhavia sp., Lepturus and/or the introduced Digitaria form an association on the north, east and south sides of the island of varying widths. Sida is commonly found with this association towards the inner portion of the island. Small pure stands of all of the native species can be found in sites which were laid bare during the Second World War occupation. On the west sand ridge Lepturus, Digitaria and Boerhavia form a local association with scattered pure stands of the two grass species. Tribulus is found in pure stands on disturbed sites near the center of the island.

Summary

1. Twenty-four species of vascular plants have been recorded and/or collected from Baker Island. Eleven attempted introductions are also recorded.

2. The native plant species and the associations formed from these have changed drastically in the past century. The native species have extended their range over the surface of the island due to the change in the substrate. The natural plant associations found by Hague about 1861 have been disrupted in area and content with the admixture of introduced plant species notably Digitaria. These associations have also extended in area spreading over formerly bare guano areas.

3. No vegetation and bird interaction can be noted at this stage in the recovery of the island. Small amounts of guano are being deposited which doubtless contribute to the healthy appearance of the vegetation after the infrequent rains.

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C.R. Long
1964

Baker

Algae collected by C. R. Long and collaborator, identified by R. Tsuda, Dept of Botany, U. of Hawaii.*

2166 C.R.Long	Baker Island	July 21, 1964 in beach drift south reef	Halimeda sp.
2169 C.R.Long	Baker Island	July 21, 1964 south beach in drift - above south reef	Halimeda opuntia(L.) Lamx.
2170a C.R.Long	Baker Island	July 21, 1964 - in beach drift - south beach	Centroceros opiculatum Yamada, epiphytic on Chondria sp.
2170 C.R.Long	Baker Island	July 21, 1964 - in beach drift - south beach	Chondria sp.
2167 (1 dup.) C.R.Long	Baker Island	July 21, 1964 - in beach drift, south reef	Turbinaria ornata (Turner) J.Ag.
2168 C.R.Long	Baker Island	July 21, 1964 - in beach drift, south beach	Dictyosphaeria cavernosa (Forsk.) Boerg.
2165a C.R.Long	Baker Island	July 21, 1964	Dictyosphaeria cavernosa (Forsk.) Boerg.
2165b C.R.Long	Baker Island	July 21, 1964 - in beach drift, south reef	Chondria sp. epiphytic on Jania adhaerens Lamx.
2165c C.R.Long	Baker Island	July 21, 1964	Jania adhaerens Lamx.
2190a C.R.Long	Howland Island	July 23, 1964 - growing sessile on exposed reef and in reef pools - west reef.	Jania adhaerens Lamx. (non fertile)
2190b C.R.Long	Howland Island	July 23, 1964	Dictyosphaeria cavernosa (Forsk.) Boerg.
2190c C.R.Long	Howland Island	July 23, 1964	Chondria sp. epiphytic on Jania
2188a C.R.Long	Howland Island	July 23, 1964 - in beach drift, west reef	Jania adhaerens Lamx. (non fertile)

C.R. Long
1964

So.1 Samples - June July 1964 Baker

July 19, 1964 McKean Island
(1) L224
L224 Boerhaavia, Portulaca, Lepturus, Digitaria Northwest end sandy 1/2-2 in.

July 21, 1964 Baker Island
(3) L225-L227
L225 - 1 Lepturus, Portulaca 1/2-2 in.
L226 - 2 east end Tribulus, Lepturus, Digitaria 1/2-2 in.
L227 - 3 sandy area southwest end runway Digitaria, Sida, 1/2-2 in.

July 22, 1964 Howland Island
(3) L228-L230
L228 - 1 south end Tribulus, Portulaca, Boerhaavia 1/2-2 in.
L229 - 2 east side Digitaria solid stand 1/2-2 in.
L230 - 3 central area Tribulus, Digitaria, Portulaca, Lepturus, 1/2-2 in.

July 23, 1964 Howland Island
(3) L231-L233
L231 - 1 Tribulus, Portulaca, Boerhaavia mid north area gravel on top 1/2-2 in.
L232 - 2 1/2-2 in. Tribulus, Portulaca mid south area nesting sooty tern.
L233 - 3 Masked booby nest 1/2-2 in.

July 24, 1964 Howland Island
(2) L234-L235
L234 - 1 1/2-2 in. east beach log on beach hermit crabs underneath
L235 - 2 Surface- 1/2 log on beach hermit crabs east beach

C.R. Long
1964

Summary of June-July Botanical Field work

Baker

July 16, 1964

Worked on U.S.S. Takelma in the morning and early afternoon. Collected and placed permanent markers during the late afternoon, and early evening on the north end of the island. Collection No. 2011 - 2020.

July 17, 1964

Collected in the west, south and east sides of the island. Collection No. 2021 - 2024.

McKean Island

July 18, 1964

Vegetation transects were made on north and south ends of the island. Collection No. 2025 - 2037. Permanent markers were placed. Photographs were taken. Assisted in banding of masked boobies.

July 19, 1964

Collection No. 2038 - 2048. Collected along the west and north from the ends of the island. Assisted in the banding of masked boobies.

Baker Island

July 21, 1964

Collections made on the south, east, north and west portions of the island. Collection No. 2049 -

Howland Island

July 22, 1964

Vegetative transects were made. Collection No. 2170 - 2179. Permanent markers were placed.

July 23, 1964

Vegetative transects and photographs were made. Permanent markers were placed.

C.R. Long
1964

Baker

Enderbury Island July 15, 1964

1 *Sida fallax* Walp.
2 *Triumfetta procumbens*
3 *Portulaca lutea* Sol.
4 *Digitaria pacifica* Stapf.
5 *Lepturus repens* (Forst.) R.Br.
6 *Boerhaavia diffusa* (Forst.)R.Br.
7 *Cassytha filiformis* L.
8 *Eragrostis whitneyi* Fosberg
9 *Sesuvium portulacastrum* L.
10 *Ipomoea* sp.
11 *Messerschmidtia argentea* (L.f.) Johnston
12 *Cordia subcordata* Lam.
13 *Fleurya ruderalis* (Forst. Gaud.

McKean Island July 18, 1964

1 *Sida fallax* Walp.
2 *Lepturus repens* (Forst.) R.Br.
3 *Portulaca lutea* Sol.
4 *Boerhaavia diffusa* L.
5 *Digitaria pacifica* Stapf.
6 *Tribulus cistoides* L.
7 *Sesuvium portulacastrum* L.

Baker Island July 21, 1964

1 *Triumfetta procumbens*
2 *Digitaria pacifica*
3 *Sida fallax* Walp.
4 *Lepturus repens* (Forst.) R.Br.
5 *Boerhaavia diffusa* L.
6 *Euphorbia hirta* L.
7 *Portulaca lutea* Sol.
8 *Euphorbia prostrata* Sit.
9 *Mimosa sensitiva*
10 *Cynodon dactylon* (L.) Pers.

11 Setaria verticellata (L.) Beauv.

12 Cenchrus echinatus L.

Howland Island July 22, 23, 24, 1964

1 Sida fallax Walp.

2 Tribulus cistoides L.

3 Coccoloba uvifera Jacq.

4 Lepturus repens (Forst.) R.Br.

5 Digitaria pacifica Stapf.

6 Cordia subcordata Lam.

7 Portulaca lutea Sol.

8 Boerhaavia diffusa L.

9 Leguminosae